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GROUP 14

# ENGINE COOLING

## CONTENTS

# GENERAL INFORMATION

M1141000100906

The cooling system is designed to keep every part of the engine at appropriate temperature in whatever condition the engine may be operated. The cooling method is of the water-cooled, pressure forced circulation type in which the water pump pressurizes coolant and circulates it throughout the engine. If the coolant temperature exceeds the prescribed temperature, the thermostat opens to circulate the coolant through the radiator as well so that the heat absorbed by the coolant may be radiated into the air. The water pump is of the centrifugal impeller type and is driven by the drive belt from the crankshaft. The radiator is the corrugated fin, cross flow type.

| Item | | 4A9 | 4G1 |
|---|---|---|---|
| Radiator | Performance kJ/h | 155,200 | 175,300 |

# SERVICE SPECIFICATIONS

M1141000300609

| Item | | | Standard value | Limit |
|---|---|---|---|---|
| Valve opening pressure of radiator cap kPa | | | 74 – 103 | Minimum 64 |
| Range of coolant antifreeze concentration of radiator % | | | 30 – 60 | – |
| Thermostat | Valve opening temperature of thermostat °C | 4A9 | 82 ± 2 | – |
| | | 4G1 | 82 ± 1.5 | – |
| | Full-opening temperature of thermostat °C | | 95 | – |
| | Valve lift mm | 4A9 | 8 or more | – |
| | | 4G1 | 8.5 or more | – |

# LUBRICANTS

M1141000400736

| Item | | Specified coolant | Quantity L |
|---|---|---|---|
| Engine coolant (including radiator condense tank) | 4A9-M/T | DIA QUEEN SUPER LONG LIFE COOLANT or equivalent | 5.3 |
| | 4A9-CVT | | 5.4 |
| | 4G1 | | 6.8 |

# SEALANTS <4G1>

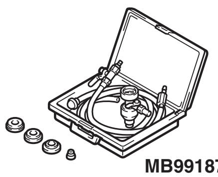
M1141000500562

| Item | Specified sealant |
|---|---|
| Cylinder block drain plug | 3M Nut Locking Part No.4171 or equivalent |
| Engine coolant temperature sensor | |

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# SPECIAL TOOL

M1141000600644

| Tool | Number | Name | Use |
|---|---|---|---|
|  MB991870AB | MB991871 | LLC changer | Coolant refilling |

# ON-VEHICLE SERVICE

## ENGINE COOLANT LEAK CHECK

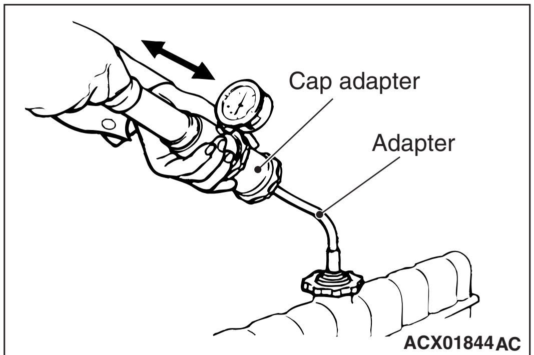
M1141001000504

⚠ *WARNING*

***When pressure testing the cooling system, slowly release cooling system pressure to avoid getting burned by hot coolant.***

⚠ CAUTION

- **Be sure to completely clean away any moisture from the places checked.**
- **When the tester is taken out, be careful not to spill any coolant.**
- **Be careful when installing and removing the tester and when testing not to deform the filler neck of the radiator.**



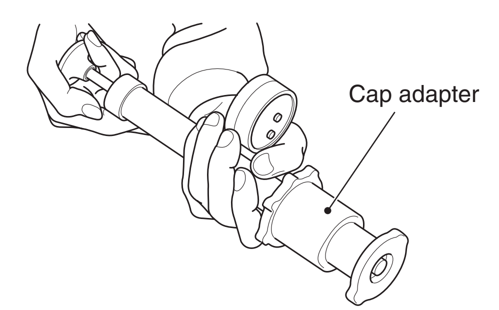
ACX01844AC

1. Check that the coolant level is up to the filler neck. Install a radiator tester and apply 160 kPa pressure, and then check for leakage from the radiator hose or connections.
2. If there is leakage, repair or replace the appropriate part.

## RADIATOR CAP VALVE OPENING PRESSURE CHECK

M1141001300624

*NOTE: Be sure that the cap is clean before testing. Rust or other foreign material on the cap seal will cause an improper reading.*



AC211643 AB

1. Use a cap adapter to attach the cap to the tester.
2. Increase the pressure until the indicator of the gauge stops moving.

   **Minimum limit: 64 kPa**
   **Standard value: 74 – 103 kPa**
3. Replace the radiator cap if the reading does not remain at or above the limit.

## ENGINE COOLANT REPLACEMENT <4A9>

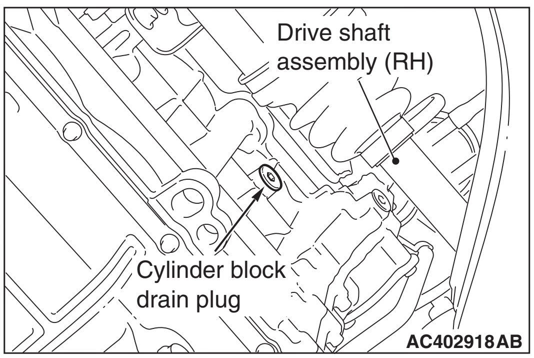
M1141001200984

### NOT USING SPECIAL TOOL LLC CHANGER (MB991871)<CVT>

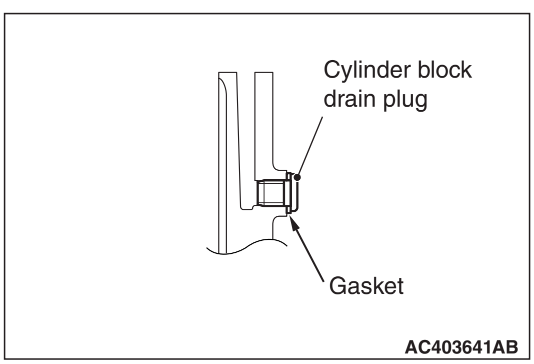
**⚠ WARNING**

***When removing the radiator cap, use care to avoid contact with hot coolant or steam. Place a shop towel over the cap and turn the cap anti-clockwise a little to let the pressure escape through the vinyl tube. After relieving the steam pressure, remove the cap by slowly turning it anti-clockwise.***

1. Drain the water from the radiator, heater core and engine after unplugging the radiator drain plug and removing the radiator cap.



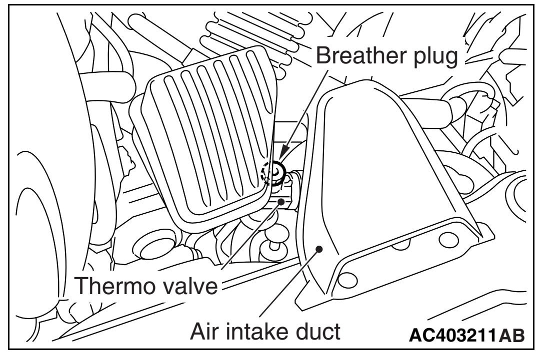

2. Drain the water in the water jacket by unplugging the drain plug of the cylinder block.
3. Remove the radiator condenser tank and drain the coolant.
4. Drain the coolant then clean the path of the coolant by injecting water into the radiator from the radiator cap area.




5. Replace the gasket, and tighten the cylinder block drain plug to the specified torque.

   **Tightening torque: 27 ± 3 N·m**

6. Securely tighten the drain plug of the radiator.
7. Reinstall the radiator condenser tank.



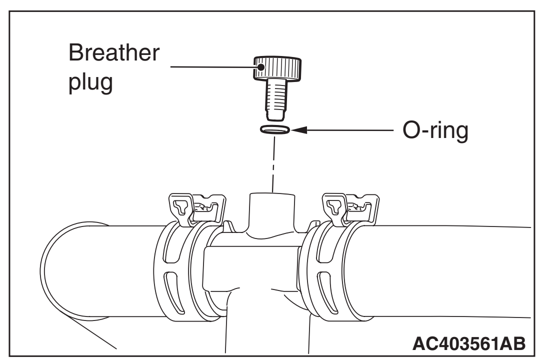

8. Remove the thermo valve breather plug.

**⚠ CAUTION**

**Do not use alcohol or methanol anti-freeze or any engine coolants mixed with alcohol or methanol anti-freeze. The use of an improper anti-freeze can cause corrosion of the aluminium components.**

9. By referring to the section on coolant, select an appropriate concentration for safe operating temperature within the range of 30 to 60%. Refill engine coolant gradually through the radiator cap. A convenient mixture is a 50% water and 50% antifreeze solution (freezing point: –31°C).

   **Recommended antifreeze: DIA QUEEN SUPER LONG LIFE COOLANT or equivalent**
   **Quantity: 5.4 L**




10. When no more air bubbles appear from the thermo valve breather plug, replace the breather plug and O-ring. Then tighten the breather plug to the specified torque.

    **Tightening torque: 1.5 ± 0.3 N·m**

11. Refill the engine coolant up to the top of the radiator port.
12. Tighten the radiator cap securely.
13. Remove the radiator condenser tank cap, and add the engine coolant up to the "F" line of the level gauge.
14. Turn the A/C switch to OFF position to start the engine and warm up until the cooling fan operates.

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*NOTE: This work is to open the thermostat fully.*

15. Rev the engine several times and then stop it. Check that there are no coolant leaks.
16. Remove the radiator cap with the engine cool, and then refill the engine coolant up to the top of the radiator port.
17. Tighten the radiator cap securely.

**⚠ CAUTION**

**Do not overfill the radiator condenser tank.**

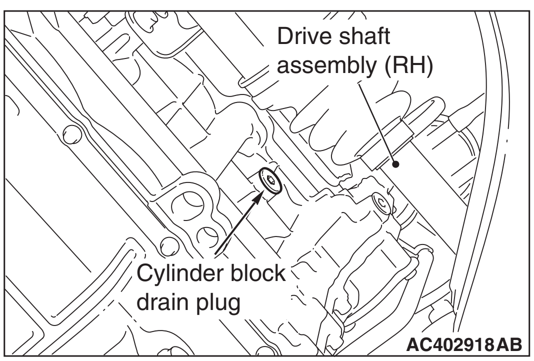
18. Remove the radiator condenser tank cap, and add the engine coolant up to the "F" line of the level gauge.

## USING SPECIAL TOOL LLC CHANGER (MB991871)

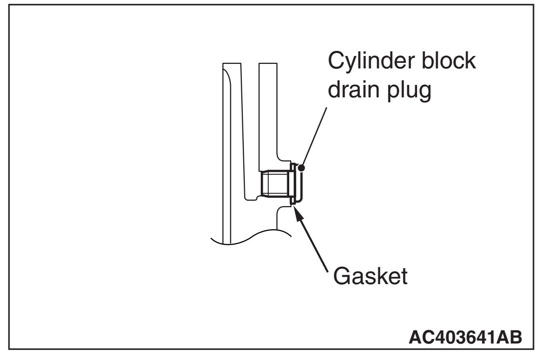
***⚠ WARNING***

***When removing the radiator cap, use care to avoid contact with hot coolant or steam. Place a shop towel over the cap and turn the cap anti-clockwise a little to let the pressure escape through the vinyl tube. After relieving the steam pressure, remove the cap by slowly turning it anti-clockwise.***

1. Drain the water from the radiator, heater core and engine after unplugging the radiator drain plug and removing the radiator cap.




2. Drain the water in the water jacket by unplugging the drain plug of the cylinder block.
3. Remove the radiator condenser tank and drain the coolant.
4. Drain the coolant then clean the path of the coolant by injecting water into the radiator from the radiator cap area.



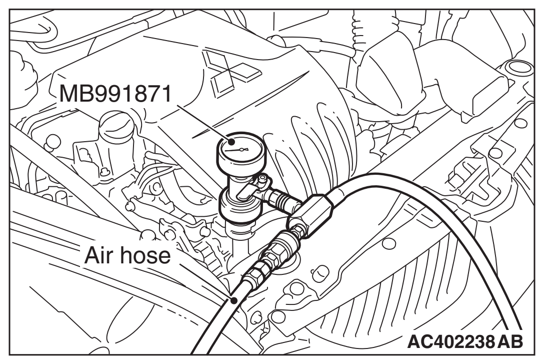

5. Replace the gasket, and tighten the cylinder block drain plug to the specified torque.

   **Tightening torque: 27 ± 3 N·m**

6. Securely tighten the drain plug of the radiator.
7. Reinstall the radiator condenser tank.

**⚠ CAUTION**

**Do not use alcohol or methanol anti-freeze or any engine coolants mixed with alcohol or methanol anti-freeze. The use of an improper anti-freeze can cause corrosion of the aluminium components.**




8. By referring to the section on coolant, select an appropriate concentration for safe operating temperature within the range of 30 to 60%. Use the special tool LLC changer (MB991871) to refill the engine coolant up to the top of the radiator port. A convenient mixture is a 50% water and 50% antifreeze solution (freezing point: –31°C).

   **Recommended antifreeze: DIA QUEEN SUPER LONG LIFE COOLANT or equivalent**
   **Quantity:**
   **<M/T> 5.3 L**
   **<CVT> 5.4 L**

   *NOTE: For how to use special tool MB991871, refer to its manufacturer's instructions.*

9. Tighten the radiator cap securely.
10. Remove the radiator condenser tank cap, and add the engine coolant up to the "F" line of the level gauge.

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11. Turn the A/C switch to OFF position to start the engine and warm up until the cooling fan operates.

    *NOTE: This work is to open the thermostat fully.*
12. Rev the engine several times and then stop it. Check that there are no coolant leaks.
13. Remove the radiator cap with the engine cool, and then refill the engine coolant up to the top of the radiator port.
14. Tighten the radiator cap securely.

**⚠ CAUTION**

**Do not overfill the radiator condenser tank.**

15. Remove the radiator condenser tank cap, and add the engine coolant up to the "F" line of the level gauge.

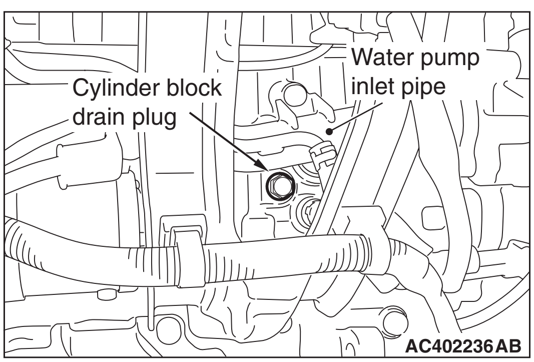
## ENGINE COOLANT REPLACEMENT <4G1>

M1141001200757

***⚠ WARNING***

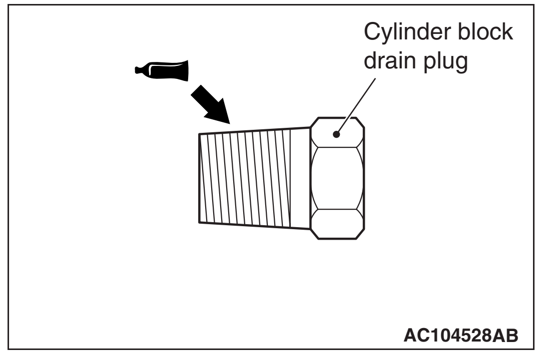
***When removing the radiator cap, use care to avoid contact with hot coolant or steam. Place a shop towel over the cap and turn the cap anti-clockwise a little to let the pressure escape through the vinyl tube. After relieving the steam pressure, remove the cap by slowly turning it anti-clockwise.***

1. Drain the water from the radiator, heater core and engine after unplugging the radiator drain plug and removing the radiator cap.




AC402236AB

2. Drain the water in the water jacket by unplugging the drain plug of the cylinder block.
3. Remove the radiator condenser tank and drain the coolant.
4. Drain the coolant then clean the path of the coolant by injecting water into the radiator from the radiator cap area.




AC104528AB

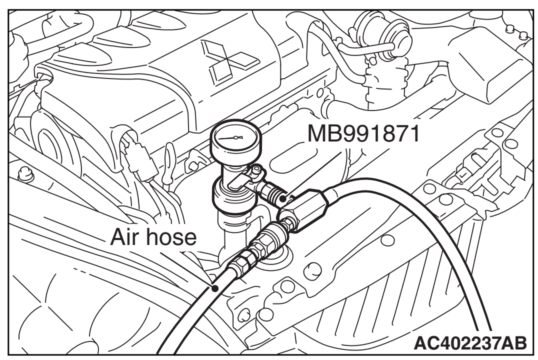
5. Apply the designated sealant to the screw area of the cylinder block drain plug, and then tighten to the specified torque.

   **Specified sealant: 3M Nut Locking Part No.4171 or equivalent**

   **Tightening torque: 40 ± 5 N·m**
6. Securely tighten the drain plug of the radiator.
7. Reinstall the radiator condenser tank.

**⚠ CAUTION**

**Do not use alcohol or methanol anti-freeze or any engine coolants mixed with alcohol or methanol anti-freeze. The use of an improper anti-freeze can cause corrosion of the aluminium components.**




AC402237AB

8. By referring to the section on coolant, select an appropriate concentration for safe operating temperature within the range of 30 to 60%. Use the special tool LLC changer (MB991871) to refill the engine coolant up to the top of the radiator port. A convenient mixture is a 50% water and 50% antifreeze solution (freezing point: –31°C).

   **Recommended antifreeze: DIA QUEEN SUPER LONG LIFE COOLANT or equivalent**

   **Quantity: 6.8 L**

   *NOTE: For how to use special tool MB991871, refer to its manufacturer's instructions.*
9. Tighten the radiator cap securely.
10. Remove the radiator condenser tank cap, and add the engine coolant up to the "F" line of the level gauge.

11. Turn the A/C switch to OFF position to start the engine and warm up until the cooling fan operates.

    *NOTE: This work is to open the thermostat fully.*

12. Rev the engine several times and then stop it. Check that there are no coolant leaks.
13. Remove the radiator cap with the engine cool, and then refill the engine coolant up to the top of the radiator port.
14. Tighten the radiator cap securely.

⚠ CAUTION

**Do not overfill the radiator condenser tank.**

15. Remove the radiator condenser tank cap, and add the engine coolant up to the "F" line of the level gauge.

## CONCENTRATION MEASUREMENT

M1141001100619

Measure the temperature and specific gravity of the engine coolant to check the antifreeze concentration.

**Standard value: 30 – 60% (allowable concentration range)**

**Recommended antifreeze: DIAQUEEN SUPER LONG LIFE COOLANT or equivalent**

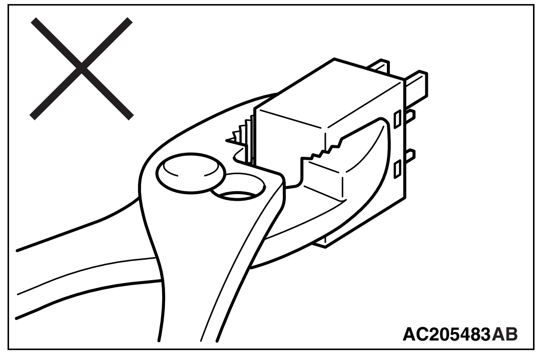
⚠ CAUTION

**If the concentration of the anti-freeze is below 30%, the anti-corrosion property will be adversely affected. In addition, if the concentration is above 60%, both the anti-freezing and engine cooling properties will decrease, affecting the engine adversely. For these reasons, be sure to maintain the concentration level within the specified range.**

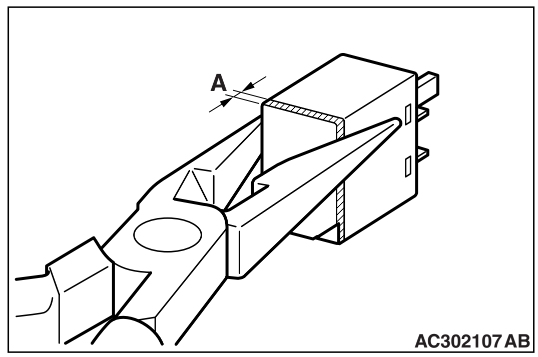
## COOLING FAN CONTROL RELAY REPLACEMENT

M1141007200089

⚠ CAUTION




**Basically, remove or install the cooling fan control relay by hand. If the centre of relay has been pinched by pliers, it can be damaged.**



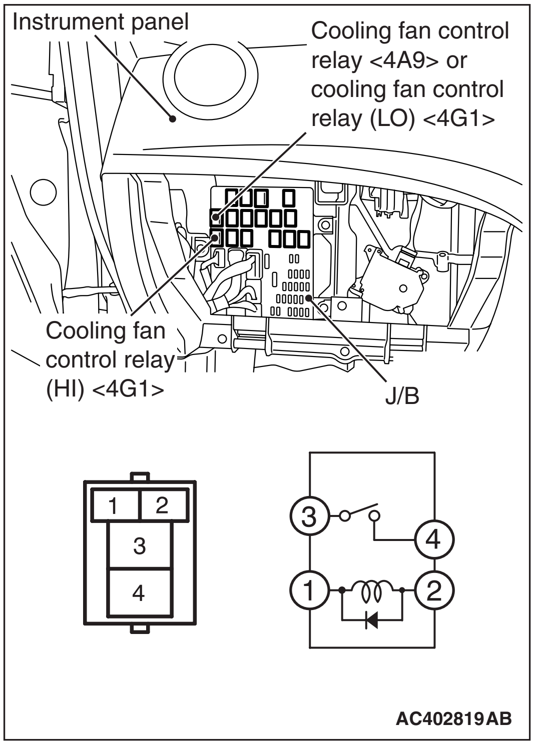

1. Remove the cooling fan control relay by hand. If it cannot be removed by hand, pinch the part A shown with long-nose pliers and remove the relay.
2. Install the new relay by hand.

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## COOLING FAN CONTROL RELAY CONTINUITY CHECK

M1141006200462



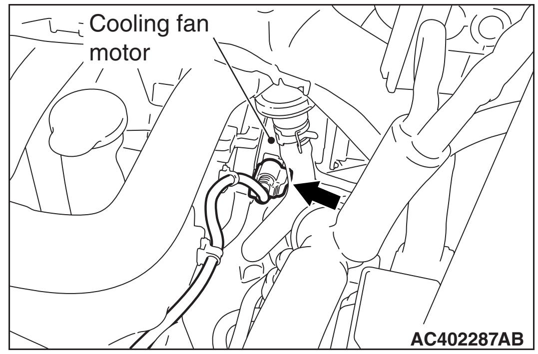

⚠ CAUTION

**Ensure the correct polarity to prevent the damage to a diode.**

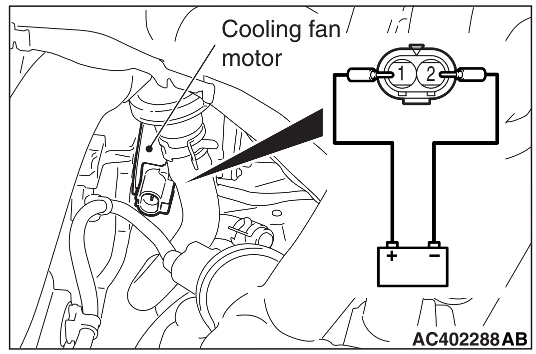
| Battery voltage | Terminal No. to be connected to tester | Continuity test results |
|---|---|---|
| Not applied | 3 – 4 | Open circuit |
| Connect terminal No.1 and battery (+) terminal. Connect terminal No.2 and battery (–) terminal. | 3 – 4 | Continuity (less than 2 Ω ) |

## COOLING FAN MOTOR CHECK <4A9>

M1141001900217




1. Remove the cooling fan motor connector.

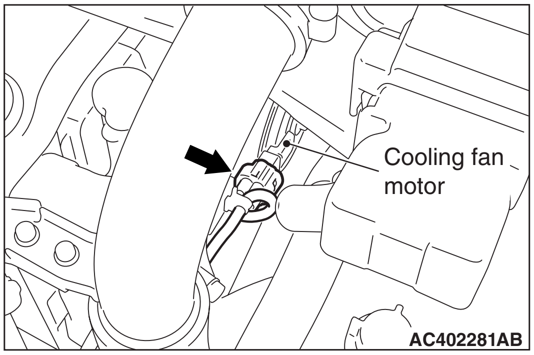



2. Check that the cooling fan motor runs when a positive battery terminal is connected to the cooling fan motor-side connector terminal No.1, and terminal No.2 is earthed. Also check to see that there is no abnormal sound emitted from the cooling fan motor at this time.
3. If the cooling fan motor is defective, replace it (Refer to P.14-22).

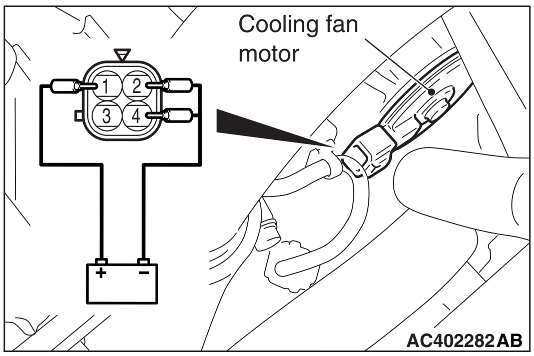
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## COOLING FAN MOTOR CHECK <4G1>

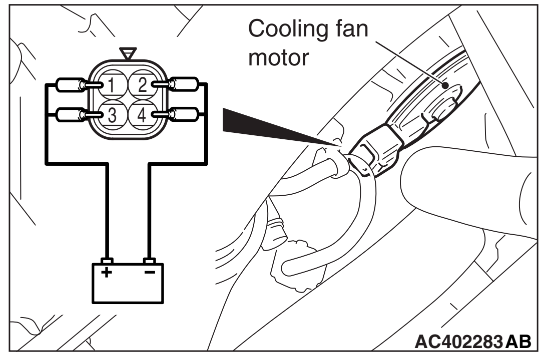
M1141001900228




1. Remove the cooling fan motor connector.




2. Check that the cooling fan motor runs at low speed when a positive battery terminal is connected to the cooling fan motor-side connector terminal No.1, and terminal Nos.2 and 4 are earthed. Also check to see that there is no abnormal sound emitted from the cooling fan motor at this time.




3. Check that the cooling fan motor runs at high speed when a positive battery terminal is connected to the cooling fan motor-side connector terminal Nos.1 and 3, and terminal Nos.2 and 4 are earthed. Also check to see that there is no abnormal sound emitted from the cooling fan motor at this time.
4. If the cooling fan motor is defective, replace it (Refer to P.14-22).

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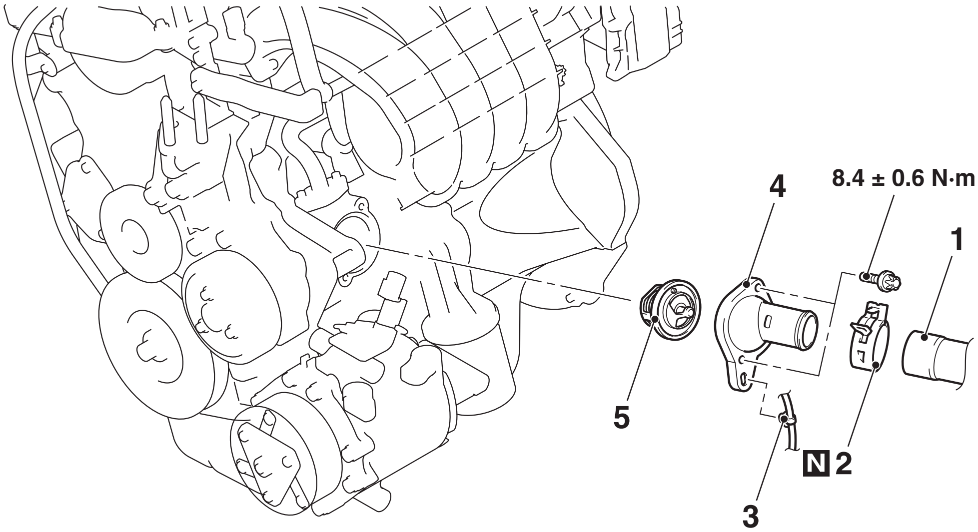
# THERMOSTAT

## REMOVAL AND INSTALLATION

M1141002400732

### <4A9>

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Engine Coolant Draining (Refer to P.14-4).<br>• Alternator Assembly Removal (Refer to GROUP 16, Charging System – Alternator Assembly P.16-13). | • Alternator Assembly Installation (Refer to GROUP 16, Charging System – Alternator Assembly P.16-13).<br>• Engine Coolant Refilling (Refer to P.14-4). |




**Removal steps**

<<**A**>> >>**B**<< 1. Radiator lower hose connection
<<**A**>> >>**B**<< 2. Hose clip
3. Control harness connection

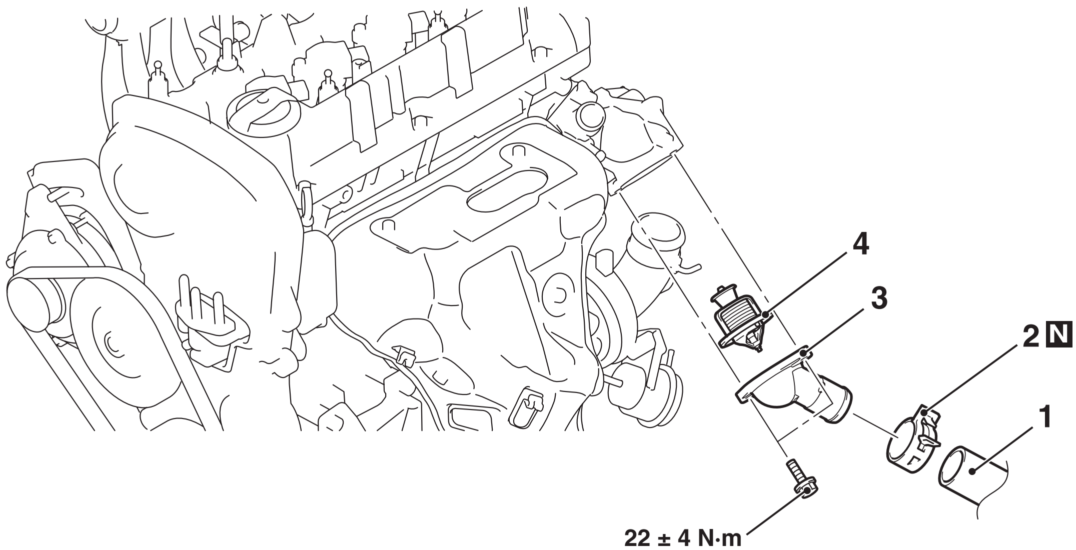
**Removal steps (Continued)**

4. Cooling water inlet hose fitting
>>**A**<< 5. Thermostat

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## <4G1>

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Front Under Cover Panel Removal (Refer to GROUP 51, Front Bumper Assembly and Radiator Grille P.51-2).<br>• Engine Coolant Draining (Refer to P.14-6).<br>• Air Hose A Removal (Refer to GROUP 15, Intercooler P.15-8). | • Air Hose A Installation (Refer to GROUP 15, Intercooler P.15-8).<br>• Engine Coolant Refilling (Refer to P.14-6).<br>• Front Under Cover Panel Installation (Refer to GROUP 51, Front Bumper Assembly and Radiator Grille P.51-2). |




AC402115AB

**Removal steps**

<<**A**>> >>**B**<< 1. Radiator lower hose connection
<<**A**>> >>**B**<< 2. Hose clip

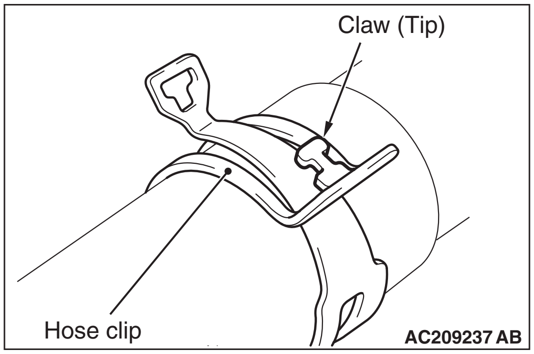
**Removal steps (Continued)**

3. Cooling water inlet hose fitting
>>**A**<< 4. Thermostat

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## REMOVAL SERVICE POINT

### <<A>> RADIATOR LOWER HOSE/HOSE CLIP DISCONNECTION




Break off the tip of hose clip claw and spread out the hose clip, then disconnect the radiator lower hose.

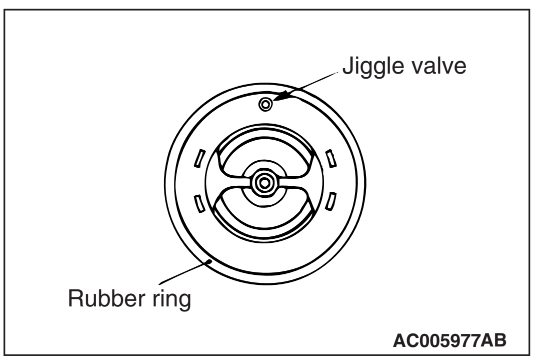
*NOTE: If there is a hose clip claw, the hose clip cannot spread to capacity because the claw contacts the hose clip.*

## INSTALLATION SERVICE POINTS

### >>A<< THERMOSTAT INSTALLATION

⚠ CAUTION

**Make absolutely sure that no oil adheres to the rubber ring of the thermostat. Also do not fold or scratch the rubber ring during installation.**




Install the thermostat so that the jiggle valve is facing straight up. Be careful not to fold or scratch the rubber ring.

### >>B<< HOSE CLIP/RADIATOR LOWER HOSE CONNECTION

⚠ CAUTION

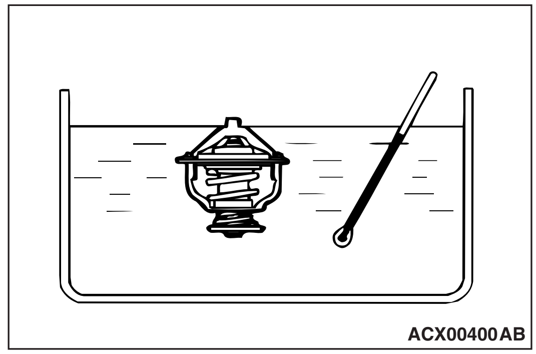
**Never reuse the hose clip whose claw is broken off to prevent the rusting.**

1. Insert a new hose clip into the radiator lower hose.
2. Insert the radiator lower hose until the protrusion of the cooling water inlet fitting.
3. Remove the hose clip claw and shorten the hose clip, then install the radiator lower hose.

## INSPECTION

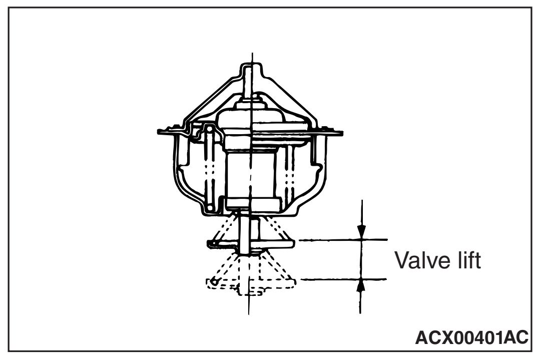
M1141002500591

### THERMOSTAT CHECK




1. Immerse the thermostat in water, and heat the water while stirring. Check the thermostat valve opening temperature.

   **Standard value: Valve opening temperature:**
   **<4A9> 82 ± 2°C**
   **<4G1> 82 ± 1.5°C**




2. Check that the amount of valve lift is at the standard value when the water is at the full-opening temperature.

   *NOTE: Measure the valve height when the thermostat is fully closed, and use this measurement to compare the valve height when the thermostat is fully open.*

   **Standard value:**
   **Full-opening temperature: 95°C**
   **Amount of valve lift:**
   **<4A9> 8 mm or more**
   **<4G1> 8.5 mm or more**

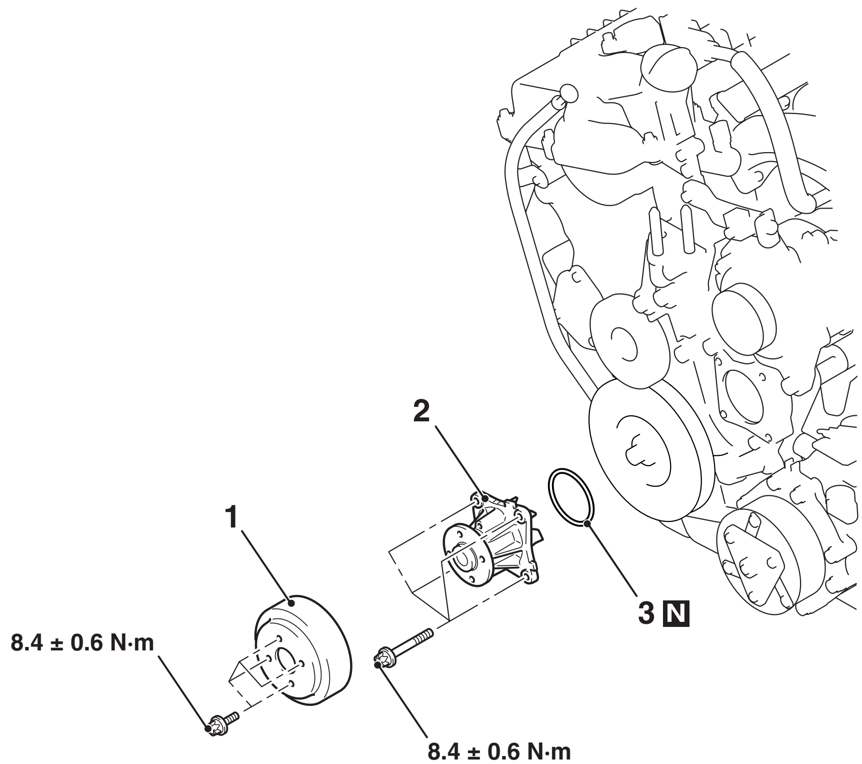
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# WATER PUMP

## REMOVAL AND INSTALLATION <4A9>

M1141002700830

| Pre-removal Operation | Post installation Operation |
|---|---|
| • Engine Coolant Draining (Refer to P.14-4).<br>• Side Under Cover Panel (RH) Removal<br>• Splash Shield Removal (Refer to GROUP 42, Fender P.42-7).<br>• Drive Belt Removal (Refer to GROUP 11A, Crankshaft Pulley P.11A-14). | • Drive Belt Installation (Refer to GROUP 11A, Crankshaft Pulley P.11A-14).<br>• Drive Belt Tension Check and Adjustment (Refer to GROUP 11A, On-vehicle Service – Drive Belt Tension Check and Adjustment P.11A-6).<br>• Engine Coolant Refilling (Refer to P.14-4).<br>• Splash Shield Installation (Refer to GROUP 42, Fender P.42-7).<br>• Side Under Cover Panel (RH) Installation |




**Removal steps**

1. Water pump pulley

**Removal steps (Continued)**

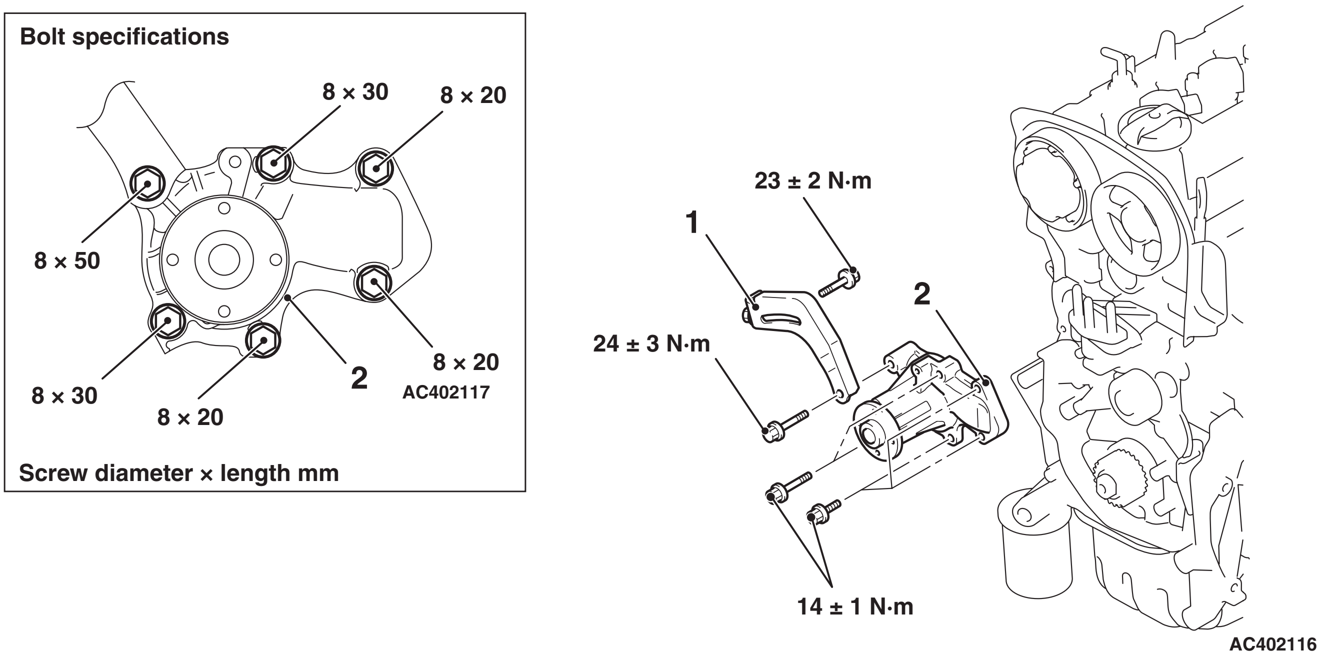
2. Water pump
3. O-ring

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## REMOVAL AND INSTALLATION <4G1>

M1141002700841

| Pre-removal Operation | Post-installation Operation |
| --- | --- |
| • Engine Coolant Draining (Refer to P.14-6).<br>• Valve Timing Belt Removal (Refer to GROUP 11C, Timing Belt P.11C-37). | • Valve Timing Belt Installation (Refer to GROUP 11C, Timing Belt P.11C-37).<br>• Engine Coolant Refilling (Refer to P.14-6). |




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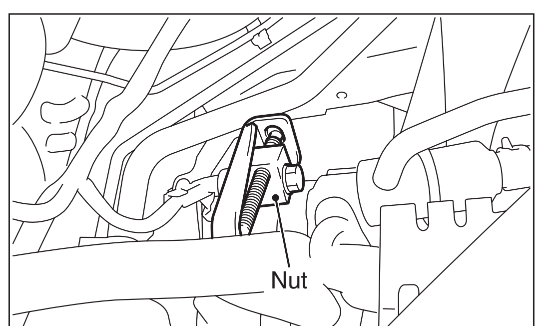
| | | Removal steps |
| --- | --- | --- |
| >>**B**<< | 1. | Alternator brace |
| >>**A**<< | 2. | Water pump |

## INSTALLATION SERVICE POINTS

### >>A<< WATER PUMP INSTALLATION

Check that the O-ring on the reverse side of water pump has not fallen out, and then install the water pump on the cylinder block.

### >>B<< ALTERNATOR BRACE INSTALLATION




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Install the alternator brace nut so that it is in the direction shown.

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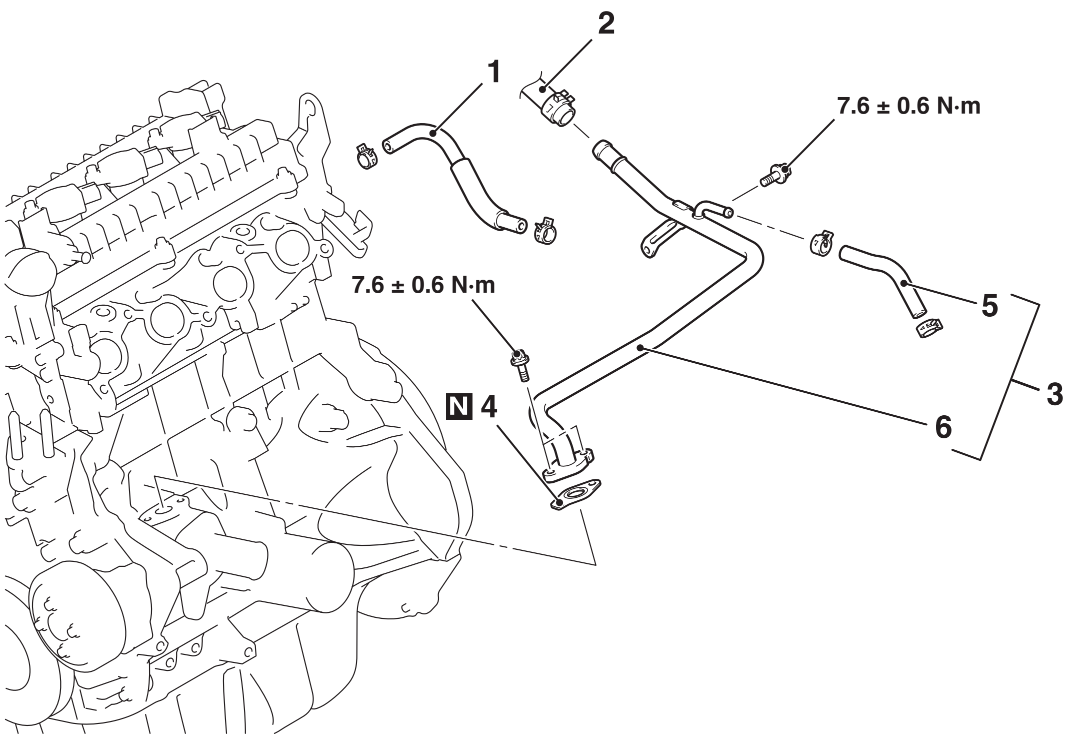
# WATER HOSE AND WATER PIPE

## REMOVAL AND INSTALLATION <4A9>

M1141003301322

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Inlet Manifold Removal (Refer to GROUP 15, Inlet Manifold P.15-11). | • Inlet Manifold Installation (Refer to GROUP 15, Inlet Manifold P.15-11).<br>• Engine Oil Check <CVT> (Refer to GROUP 12, On-vehicle Service − Engine Oil Check P.12-3). |

### <M/T>




**Removal steps**

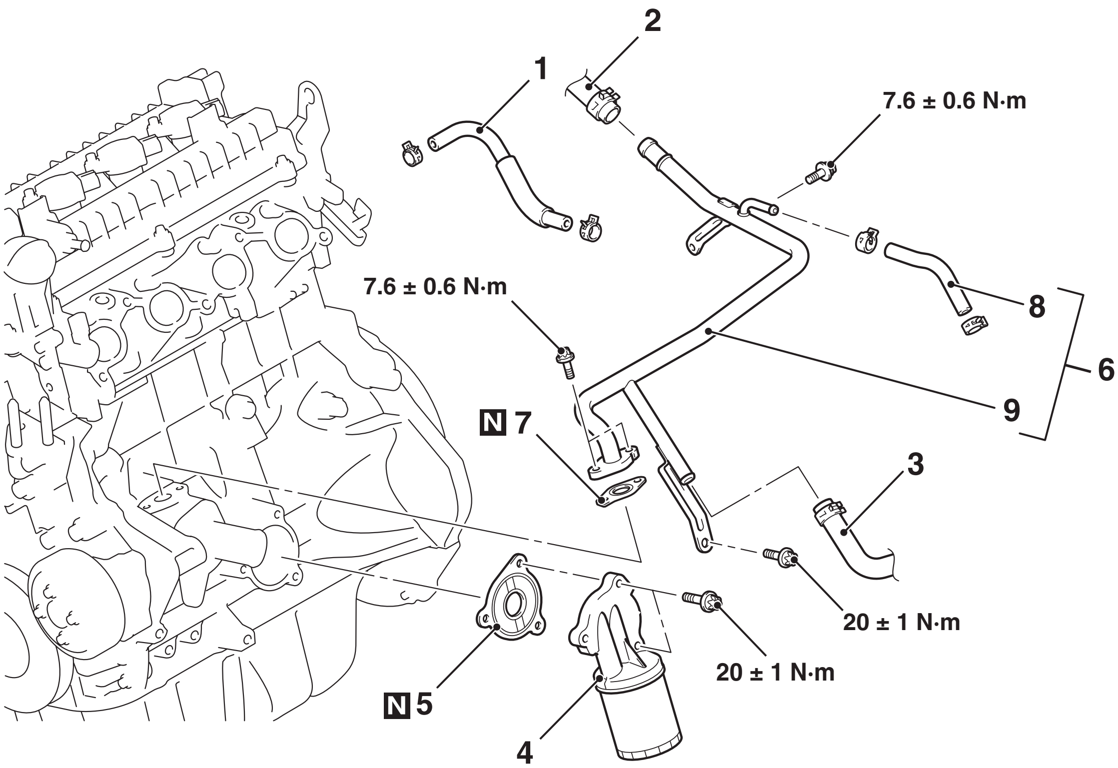
>>**A**<< 1. Throttle body water feed hose
2. Heater piping hose connection
3. Throttle body water return hose and water pump inlet pipe assembly

**Removal steps (Continued)**

>>**B**<< 4. Gasket
>>**A**<< 5. Throttle body water return hose
6. Water pump inlet pipe

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## <CVT>




**Removal steps**

>>**A**<< 1. Throttle body water feed hose
2. Heater piping hose connection
3. Water hose connection
4. Oil filter and bracket assembly
>>**C**<< 5. Gasket

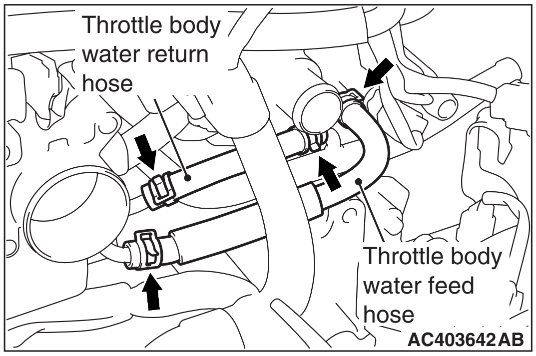
**Removal steps (Continued)**

6. Throttle body water return hose and water pump inlet pipe assembly
>>**B**<< 7. Gasket
>>**A**<< 8. Throttle body water return hose
9. Water pump inlet pipe

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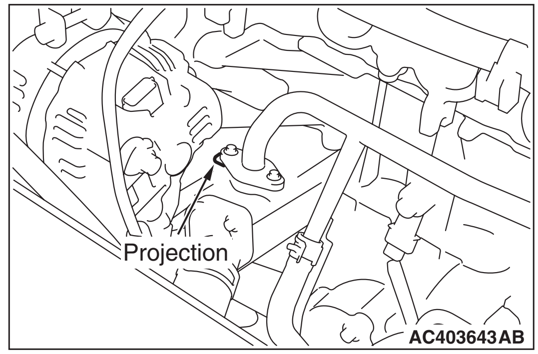
## INSTALLATION SERVICE POINTS

### >>A<< THROTTLE BODY WATER RETURN HOSE/THROTTOLE BODY WATER FEED HOSE INSTALLATION



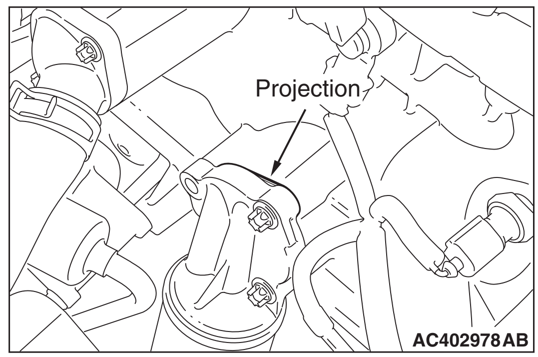

Install the hose clips as shown.

### >>B<< GASKET INSTALLATION




Install the gasket as its protrusion is in the direction shown.

### >>C<< GASKET INSTALLATION

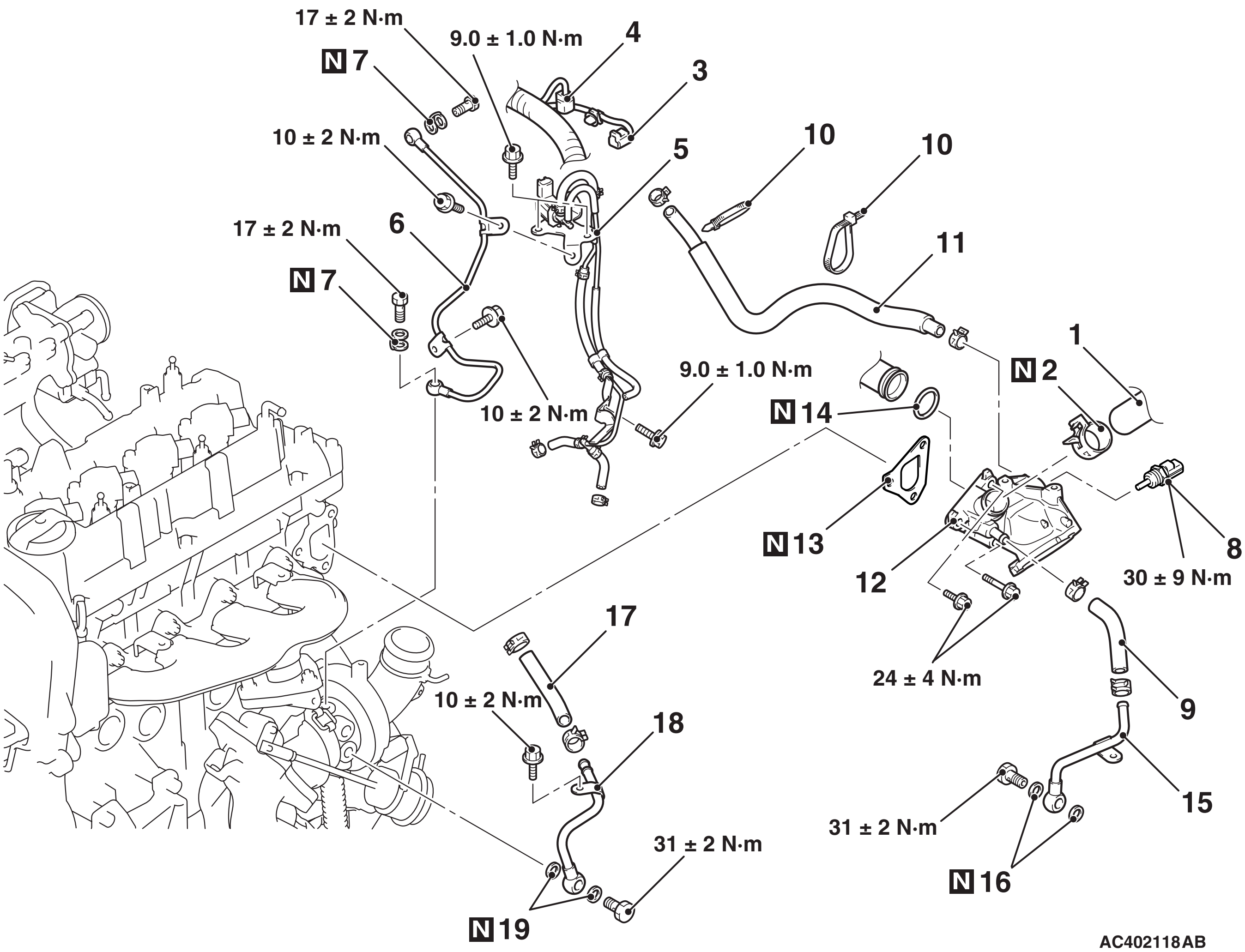



Install the gasket as its protrusion is in the direction shown.

## REMOVAL AND INSTALLATION <4G1>

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| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Thermostat Removal (Refer to P.14-10).<br>• Battery and Battery Tray Removal | • Battery and Battery Tray Installation<br>• Thermostat Installation (Refer to P.14-10). |



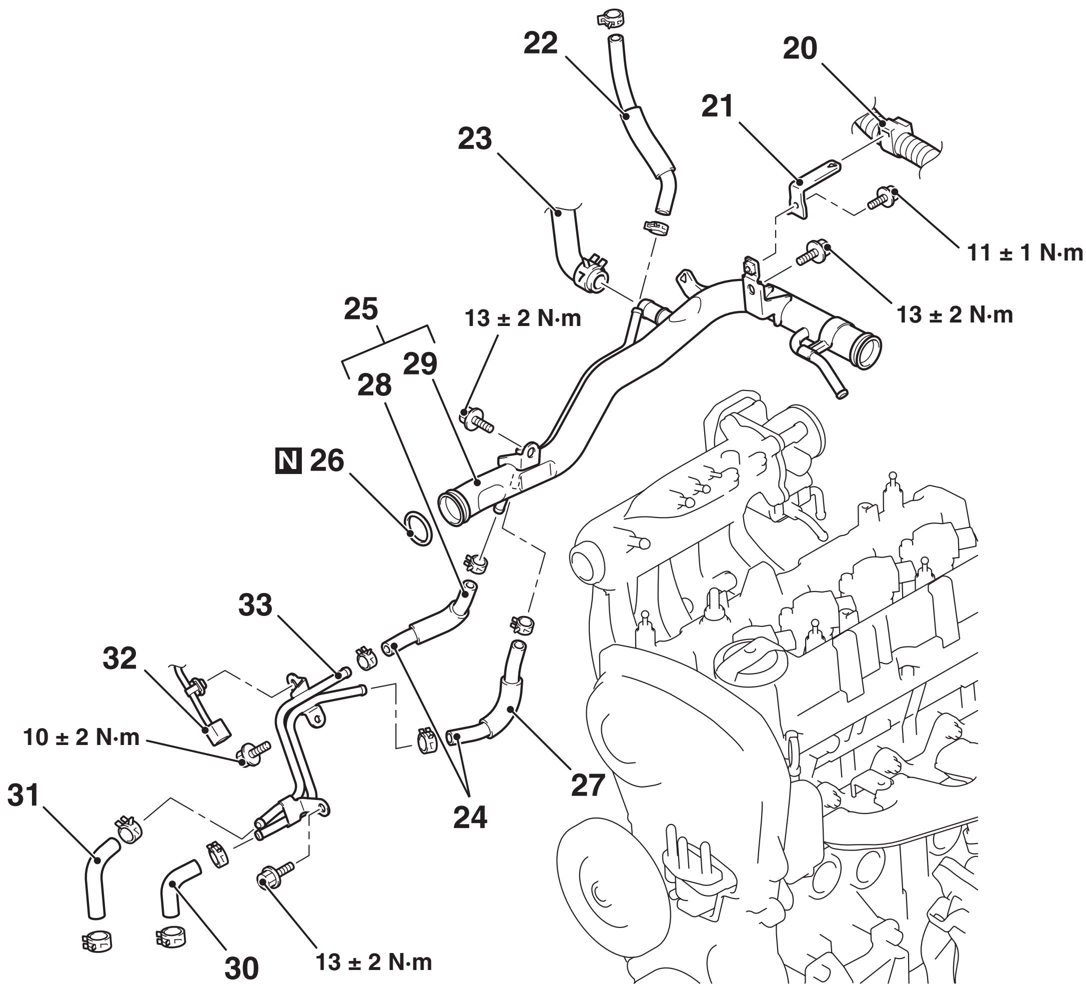

**Removal steps**

| | | | |
|---|---|---|---|
| <<**A**>> | >>**C**<< | 1. | Radiator upper hose connection |
| <<**A**>> | >>**C**<< | 2. | Hose clip |
| | | 3. | Engine coolant temperature sensor connector |
| | | 4. | Waste gate solenoid valve connector |
| | | 5. | Waste gate solenoid valve, vacuum hose and pipe assembly |
| <<**B**>> | | 6. | Turbocharger oil feed tube |
| | | 7. | Gaskets |
| | >>**B**<< | 8. | Engine coolant temperature sensor |

**Removal steps (Continued)**

| | | |
|---|---|---|
| | 9. | Turbocharger water feed hose |
| | 10. | Cable band |
| | 11. | Throttle body water feed hose |
| >>**A**<< | 12. | Thermostat case |
| | 13. | Gasket |
| >>**A**<< | 14. | O-ring |
| | 15. | Turbocharger water feed pipe |
| | 16. | Gaskets |
| | 17. | Turbocharger water return hose |
| | 18. | Turbocharger water return pipe |
| | 19. | Gaskets |

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**Removal steps**

- <<C>> • Cowl top panel (Refer to GROUP 42, Loose Panel P.42-81).
- 20. Control harness connection
- 21. Harness bracket
- 22. Throttle body water return hose
- 23. Heater piping hose connection
- 24. Engine oil cooler water hoses connection
- >>A<< 25. Engine oil cooler water hose and water pump inlet pipe assembly
- >>A<< 26. O-ring

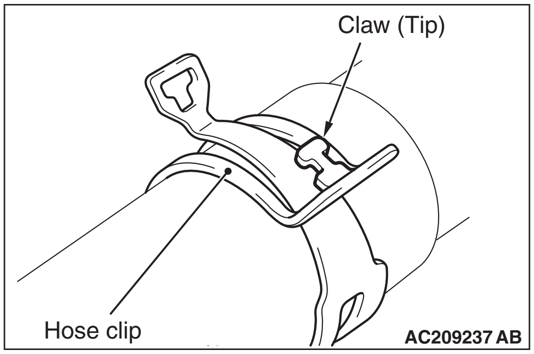
**Removal steps (Continued)**

- 27. Engine oil cooler water feed hose
- 28. Engine oil cooler water return hose
- 29. Water pump inlet pipe
- 30. Engine oil cooler water feed hose
- 31. Engine oil cooler water return hose
- • Alternator drive belt (Refer to GROUP 11C, Crankshaft Pulley P.11C-17).
- 32. Engine oil pressure switch connector
- 33. Cooling water inlet pipe

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## REMOVAL SERVICE POINTS

### <<A>> RADIATOR UPPER HOSE/HOSE CLIP DISCONNECTION




Break off the tip of hose clip claw and spread out the hose clip, then disconnect the radiator upper hose.

*NOTE: If there is a hose clip claw, the hose clip cannot spread to capacity because the claw contacts the hose clip.*

### <<B>>TURBOCHARGER OIL FEED TUBE REMOVAL

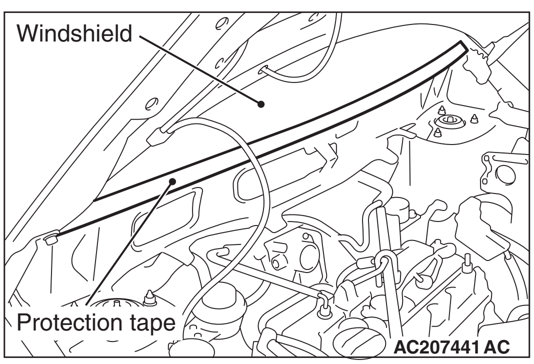
⚠ CAUTION

**Remove the turbocharger oil feed tube, and make sure that no dirt or foreign objects enter the oil channel of the turbocharger.**

### <<C>> COWL TOP PANEL REMOVAL

⚠ CAUTION

**After removing the cowl top panel, perform the operation with care not to damage the windshield.**



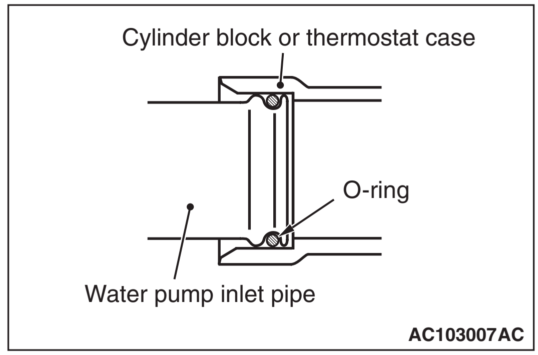

After removing the cowl top panel, attach a protection tape on the lower area of the windshield for its protection.

## INSTALLATION SERVICE POINTS

### >>A<< O-RING/ENGINE OIL COOLER WATER HOSE AND WATER PUMP INLET PIPE ASSEMBLY/THERMOSTAT CASE INSTALLATION

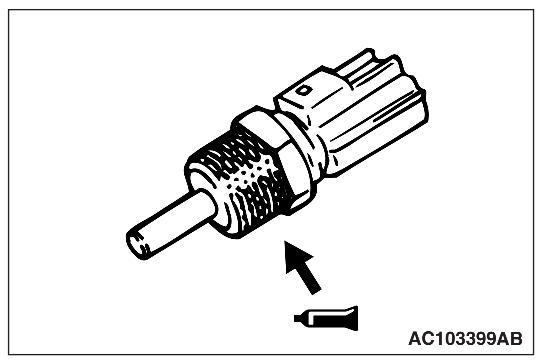
⚠ CAUTION

**Do not allow engine oil or other grease to adhere to the cooling water line O-ring**




Fit the O-ring to the groove in the water pump inlet pipe. Then lubricate the rim of O-ring or the inside of water pump inlet pipe fixing position with water, and then insert the water pump inlet pipe to the cylinder block or the thermostat case.

### >>B<< ENGINE COOLANT TEMPERATURE SENSOR INSTALLATION




Apply the specified sealant to the thread of the engine coolant temperature sensor, and then tighten it to the specified torque.

**Specified Sealant: 3M Nut Locking Part No.4171 or equivalent**
**Tightening torque: 30 ± 9 N·m**

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## >>C<< HOSE CLIP/RADIATOR UPPER HOSE CONNECTION

**⚠ CAUTION**

**Never reuse the hose clip whose claw is broken off to prevent the rusting.**

1. Insert a new hose clip into the radiator upper hose.
2. Insert the radiator upper hose until the protrusion of the thermostat case.
3. Remove the hose clip claw and shorten the hose clip, then install the radiator upper hose.

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# RADIATOR

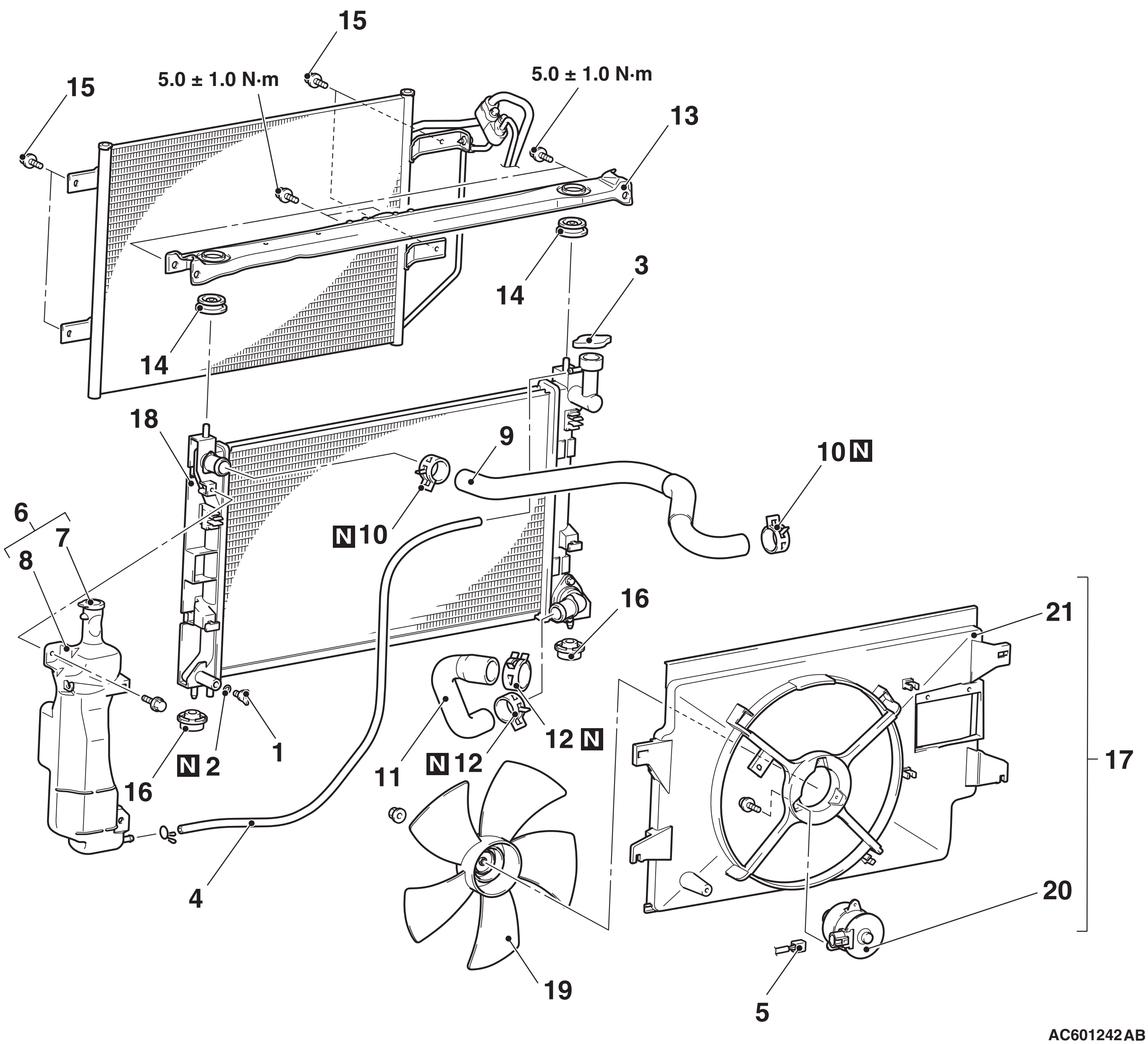
## REMOVAL AND INSTALLATION

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### <4A9>

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Engine Coolant Draining (Refer to P.14-4).<br>• Air Cleaner Removal (Refer to GROUP 15, Air Cleaner P.15-5).<br>• Front Bumper Face Assembly Removal (Refer to GROUP 51, Front Bumper Assembly and Radiator Grille P.51-2). | • Front Bumper Face Assembly Installation (Refer to GROUP 51, Front Bumper Assembly and Radiator Grille P.51-2).<br>• Air Cleaner Installation (Refer to GROUP 15, Air Cleaner P.15-5).<br>• Engine Coolant Refilling (Refer to P.14-4). |

### <M/T>




**Radiator removal steps**

1. Radiator drain plug
2. O-ring
3. Radiator cap
4. Radiator condenser tank hose

**Radiator removal steps**

5. Cooling fan motor connector
6. Radiator condenser tank assembly
7. Radiator condenser tank cap
8. Radiator condenser tank

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**Radiator removal steps**

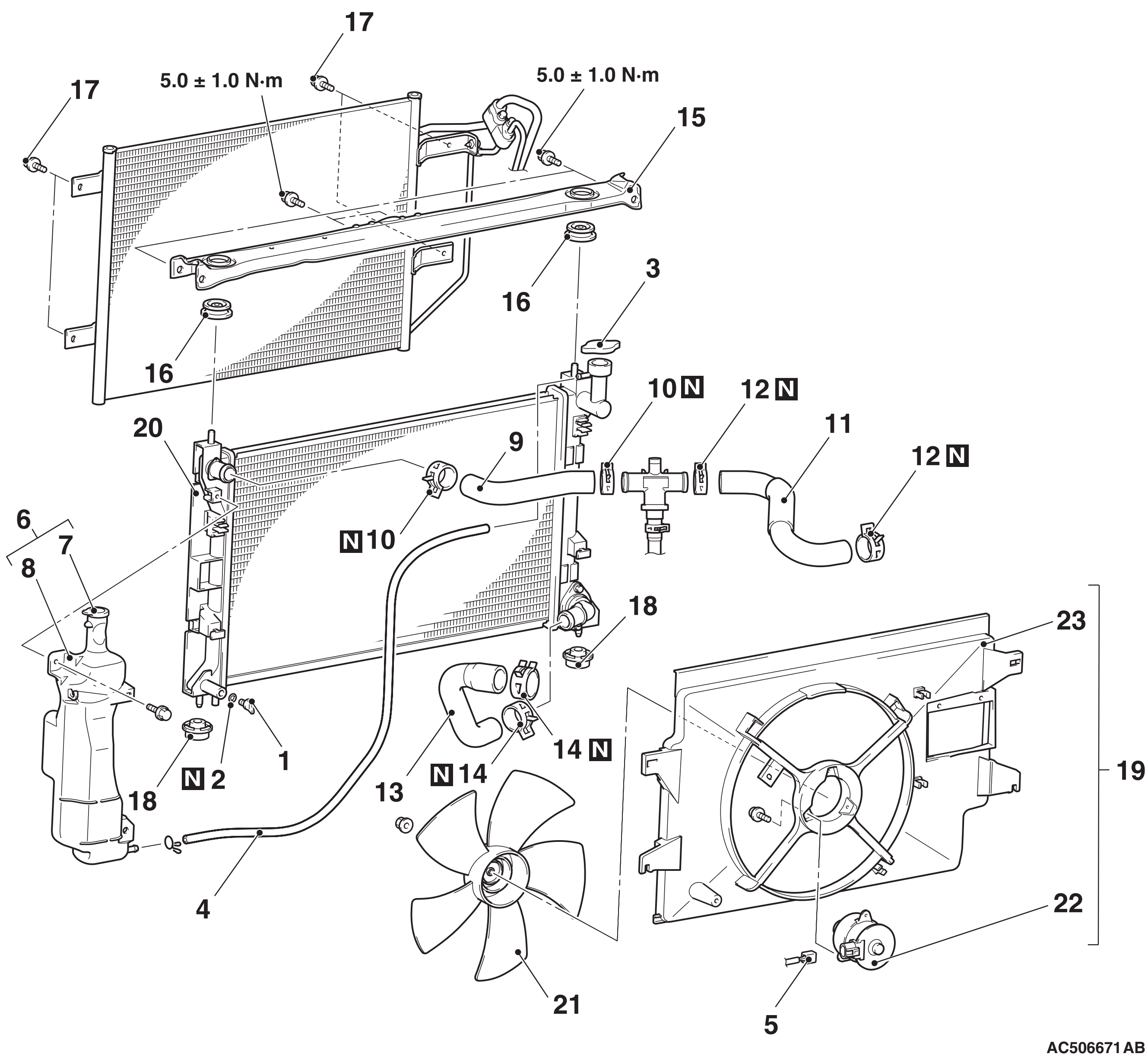
<<**A**>> >>**A**<< 9. Radiator upper hose
<<**A**>> >>**A**<< 10. Hose clips
<<**A**>> >>**A**<< 11. Radiator lower hose
<<**A**>> >>**A**<< 12. Hose clips
13. Headlamp support upper panel
14. Radiator support upper insulators
15. A/C condenser mounting bolts
• Radiator assembly
16. Radiator support lower insulators
17. Cooling fan, cooling fan motor and cooling fan shroud assembly
18. Radiator

**Cooling fan, cooling fan motor and cooling fan shroud removal steps**

4. Radiator condenser tank hose
5. Cooling fan motor connector
6. Radiator condenser tank assembly
13. Headlamp support upper panel
17. Cooling fan, cooling fan motor and cooling fan shroud assembly
19. Cooling fan
20. Cooling fan motor
21. Cooling fan shroud

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## <CVT>




**Radiator removal steps**

1. Radiator drain plug
2. O-ring
3. Radiator cap
4. Radiator condenser tank hose
5. Cooling fan motor connector
6. Radiator condenser tank assembly
7. Radiator condenser tank cap
8. Radiator condenser tank

<<**A**>> >>**A**<< 9. Radiator upper hose
<<**A**>> >>**A**<< 10. Hose clips
<<**A**>> >>**A**<< 11. Radiator upper hose
<<**A**>> >>**A**<< 12. Hose clips
<<**A**>> >>**A**<< 13. Radiator lower hose
<<**A**>> >>**A**<< 14. Hose clips

15. Headlamp support upper panel
16. Radiator support upper insulators
17. A/C condenser mounting bolts

**Radiator removal steps**

- Radiator assembly

18. Radiator support lower insulators
19. Cooling fan, cooling fan motor and cooling fan shroud assembly
20. Radiator

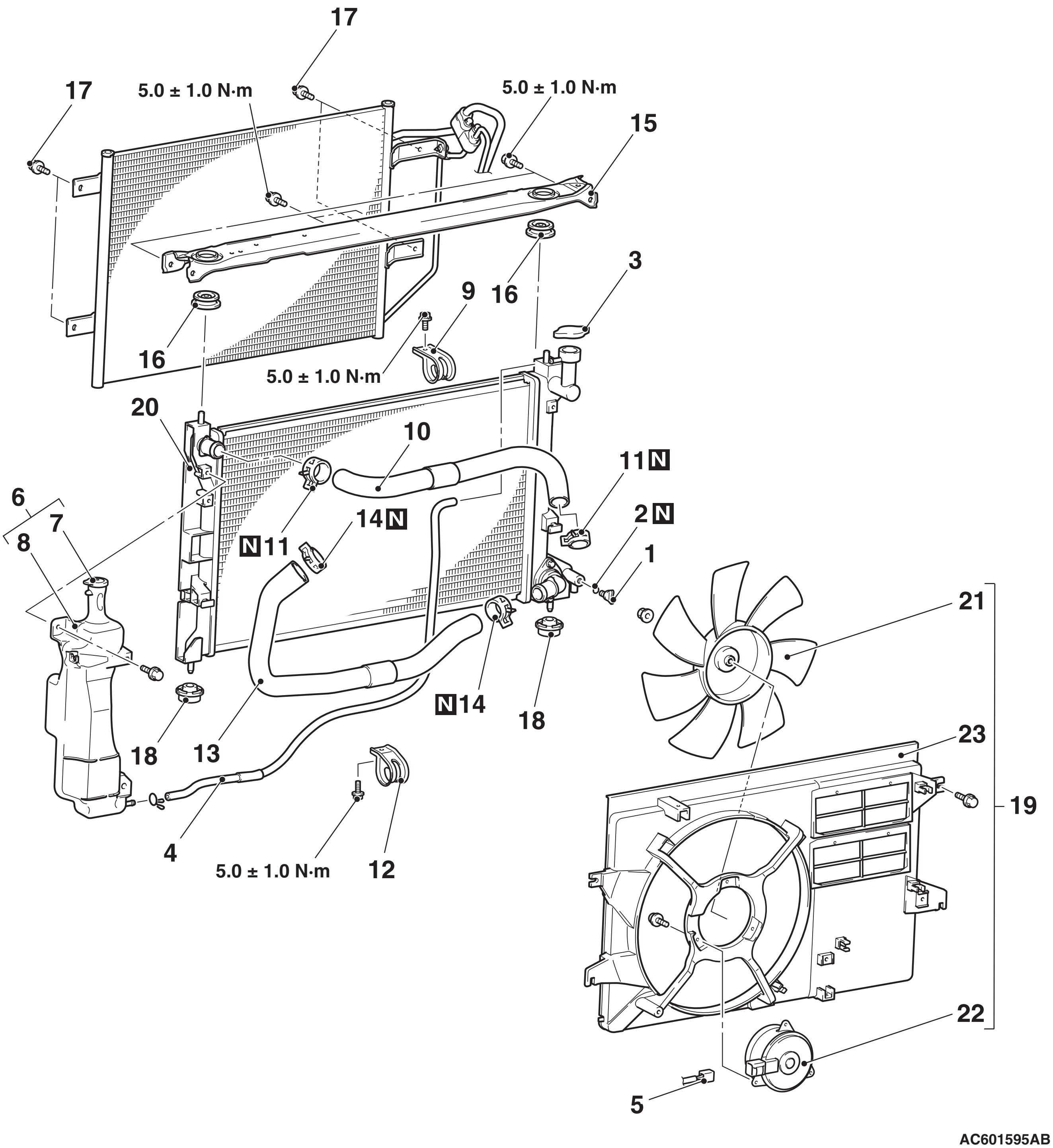
**Cooling fan, cooling fan motor and cooling fan shroud removal steps**

4. Radiator condenser tank hose
5. Cooling fan motor connector
6. Radiator condenser tank assembly
15. Headlamp support upper panel
19. Cooling fan, cooling fan motor and cooling fan shroud assembly
21. Cooling fan
22. Cooling fan motor
23. Cooling fan shroud

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## <4G1>

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Engine Coolant Draining (Refer to P.14-6).<br>• Air Cleaner Removal (Refer to GROUP 15, Air Cleaner P.15-6).<br>• Air Hose, Air Pipe and Intercooler Removal (Refer to GROUP 15, Intercooler P.15-8). | • Air Hose, Air Pipe and Intercooler Installation (Refer to GROUP 15, Intercooler P.15-8).<br>• Air Cleaner Installation (Refer to GROUP 15, Air Cleaner P.15-6).<br>• Engine Coolant Refilling (Refer to P.14-6). |




**Radiator removal steps**

1. Radiator drain plug
2. O-ring
3. Radiator cap
4. Radiator condenser tank hose

**Radiator removal steps**

5. Cooling fan motor connector
6. Radiator condenser tank assembly
7. Radiator condenser tank cap
8. Radiator condenser tank

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**Radiator removal steps**

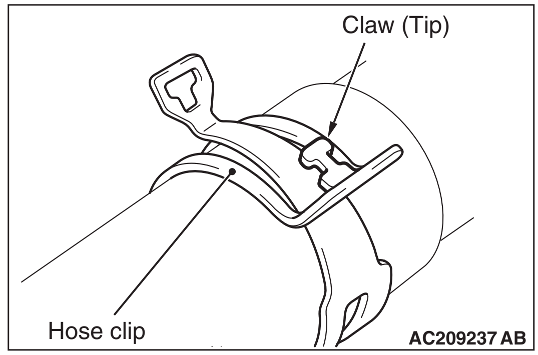
- 9. Radiator piping clamp
- <<A>> >>A<< 10. Radiator upper hose
- <<A>> >>A<< 11. Hose clips
- 12. Radiator piping clamp
- <<A>> >>A<< 13. Radiator lower hose
- <<A>> >>A<< 14. Hose clips
- 15. Headlamp support upper panel
- 16. Radiator support upper insulators
- 17. A/C condenser mounting bolts
- • Radiator assembly
- 18. Radiator support lower insulators
- 19. Cooling fan, cooling fan motor and cooling fan shroud assembly
- 20. Radiator

**Cooling fan, cooling fan motor and cooling fan shroud removal**

- 4. Radiator condenser tank hose
- 5. Cooling fan motor connector
- 6. Radiator condenser tank assembly
- 9. Radiator piping clip
- 12. Radiator piping clip
- 15. Headlamp support upper panel
- 19. Cooling fan, cooling fan motor and cooling fan shroud assembly
- 21. Cooling fan
- 22. Cooling fan motor
- 23. Cooling fan shroud

## REMOVAL SERVICE POINT

### <<A>> RADIATOR UPPER HOSE/RADIATOR LOWER HOSE/HOSE CLIPS REMOVAL




Break off the tip of hose clip claw and spread out the hose clip, then disconnect the radiator lower hose.

*NOTE: If there is a hose clip claw, the hose clip cannot spread to capacity because the claw contacts the hose clip.*

## INSTALLATION SERVICE POINT

### >>A<< HOSE CLIPS/RADIATOR LOWER HOSE/RADIATOR UPPWER HOSE INSTALLATION

⚠ **CAUTION**

**Never reuse the hose clip whose claw is broken off to prevent the rusting.**

1. Insert a new hose clip into the radiator hose.
2. Insert the radiator hose until the protrusion at both radiator and engine side.
3. Remove the hose clip claw and shorten the hose clip, then install the radiator hose.